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Baryscapus transversalis Graham (Hymenoptera: Eulophidae) – A NEW SPECIES FOR THE FAUNA OF BOSNIA AND HERZEGOVINA

Baryscapus transversalis Graham (Hymenoptera: Eulophidae) – NOVA VRSTA U FAUNI BOSNE I HERCEGOVINE

Peter BOYADZHIEV[1], Mirza DAUTBASIC[2] Osman MUJEZINOVIC[2], Plamen MIRCHEV[3], Georgi GEORGIEV[3], Margarita GEORGIEVA[3]

Summary

Baryscapus transversalis (Hymenoptera: Eulophidae) was established for first time as an egg hyperparasitoid of *Thaumetopoea pityocampa* (Lepidoptera: Notodontidae) in Bosnia and Herzegovina. It was reared from egg batches of pine processionary moth collected on *Pinus nigra* in the region of Boracko jezero. In laboratory conditions, 80 specimens of *B. transversalis* were reared during emerging period of 20 days between 3 and 22 November 2013. In the eggs of *T. pityocampa*, both males and females of *B. transversalis* developed, in sex ratio (♀♀:♂♂) 3:1.

KEY WORDS: first record, hyperparasitoid, *Thaumetopoea pityocampa*, Bosnia and Herzegovina

INTRODUCTION
UVOD

Baryscapus transversalis Graham, 1991 (Hymenoptera: Eulophidae) was described on biological material from northern Greece (Graham 1991). Later, it was reported in other countries of the Balkan Peninsula (Noyes 2014), Iberian Peninsula (López-Sebastián et al. 2002–2003) and Asiatic part of Turkey (Mirchev et al. 2004). Bellin (1995) studied its life cycle and behaviour and established that it is an obligatory hyperparasitoid of the primary egg parasitoids on *Thaumetopoea pityocampa* (Denis & Schiffermüller, 1775) – *Baryscapus servadeii* (Domenichini, 1965) and *Ooencyrtus pityocampae* (Mercet, 1921) (Hymenoptera: Encyrtidae). The meconium of *B. transversalis* was described for the first time by Schmidt et al. (1997).

This note reports *B. transversalis* as a hyperparasitoid of primary egg parasitoids of *T. pityocampa* and a new species for the fauna of Bosnia and Herzegovina.

MATERIAL AND METHODS
MATERIJAL I METODE

Thirty-eight egg batches of *T. pityocampa* were collected in the region of Boracko jezero (Bosnia and Herzegovina) on *Pinus nigra* Arnold trees at 760 m a.s.l. on 21 September 2013 by the second author. The material was mailed directly

[1] Assist. Prof. Dr Peter Boyadzhiev, Department of Zoology, University of Plovdiv, 24 Tzar Assen Str., BG-4000, Plovdiv, Bulgaria;

[2] Prof. Dr Mirza Dautbašić, Assist. Prof. Dr. Osman Mujezinovic, Faculty of Forestry University of Sarajevo, Zagrebacka str. 20, Sarajevo, Bosnia-Herzegovina;

[3] Prof. DSc Plamen Mirchev, Prof. DSc Georgi Georgiev, Assist. Prof. Dr Margarita Georgieva, Forest Research Institute – Bulgarian Academy of Sciences, 132 St. Kl. Ochridski Blvd., BG-1756, Sofia, Bulgaria; E-mail: plmirchev@hotmail.com

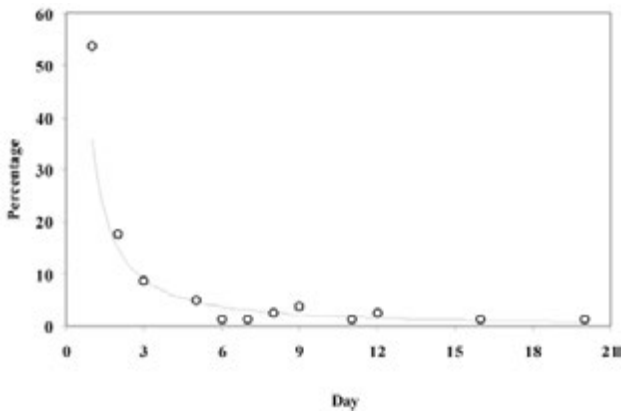
to the Forest Research Institute in Sofia for further observations of parasitoid emergence. Every egg batches were placed singly in test tubes plugged with cotton stoppers, after some measurements had been taken. Then, they were preserved in laboratory conditions at room temperature (20–22 °C). Daily observations were made and the emerged egg parasitoids were removed immediately and separated in plastic capsules for further determination.

B. transversalis was identified by the key of Graham (1991) and confirmed by Dr. E. Yegorenkova (Ulyanovsk State Pedagogical University, Ulyanovsk, Russia). A part of biological material is deposited in her entomological collection.

RESULTS
REZULTATI

In this study *B. transversalis* was recorded for the first time in Bosnia and Herzegovina and is therefore a new member for the fauna of this country. In laboratory conditions, 80 specimens of the species emerged from 8.515 eggs out of 38 pine processionary moth egg batches.

The emerging period of *B. transversalis* ended in 20 days (Graph. 1), between 3 and 22 November 2013.



Graph. 1. Emergence dynamics of *Baryscapus transversalis* in laboratory conditions (N=80)
Graf. 1. Dinamika pojave *Baryscapus transversalis* u laboratorijskim uvjetima (N=80)

In the eggs of *T. pityocampa* both males and females of *B. transversalis* developed. From 80 specimens emerged, 60 were females and 20 males – i.e. sex ratio (♀♀:♂♂) was 3:1.

DISCUSSION
DISKUSIJA

Dautbašić (2015) reported three species only as egg parasitoids of pine processionary moth in Bosnia and Herzegovina: *Baryscapus servadeii*, *Ooencyrtus pityocampae* and *Anastatus bifasciatus* (Geoffroy, 1785) (Hymenoptera: Eupelmidae).

As a general rule, the hyperparasitism does not increase the parasitoid impact but the effectiveness of primary parasitoids is reduced. Therefore, the record of the hyperparasitoid *B. transversalis* in Bosnia and Herzegovina is very important. Percentage of *B. servadeii* and *O. pityocampae* in the host eggs attacked by the hyperparasitoid in more reports were from 0.5–3.0% (Tsankov et al. 1996; Schmidt et al. 1997) to 8–12 % (Mirchev et al. 1998a), and in a site in Albania reached up to 23.6% (Mirchev et al. 2000).

After the first description of *B. transversalis* (Graham 1991), it was found again in Greece (Schmidt et al. 1997; Tsankov et al. 1999; Mirchev et al. 2010) and in other countries of Balkan Peninsula: Bulgaria (Tsankov et al. 1996, 1998; Mirchev et al. 1998a, 1998b, 2012) and Albania (Mirchev et al. 2000).

Studies of the life cycle of *B. transversalis* show that the reproduction period lasted from spring to autumn when the primary parasitoids are in diapause as mature larvae (Bellin 1995). The developmental period from egg to adult lasted about 5 weeks, and the adults did not survive more than 5 weeks. A sex ratio of 2:1 to 1:1 (females to males) was found. Males arise from arrhenotocal parthenogenesis. Tsankov et al. (1996) pointed out that *B. transversalis* is less successful in larvae of *O. pityocampae* than in those of *B. servadeii.*

In the present study, the established flight period of *B. transversalis* was very short –more than 50% of individuals emerged in the first day, and 80% – for three days (Graph. 1). The emerging period of other egg parasitoids of *T. pityocampa* lasted more than eight and a half months from 3 November 2013 to 21 July 2014 (unpublished data).

Other studies reported that *B. transversalis* always emerge before the mass flight of its host, the primary parasitoids, *O. pityocampae* and *B. servadeii* (Tsankov et al. 1996; Schmidt et al. 1997; Mirchev et al. 2000, 2004).

In most localities of *B. transversalis* both sexes of the species were established. In Bulgaria, the sex ratio varies from about equal numbers at Marikostino (Tsankov et al. 1998) to 10 times more of females at Ploski (Tsankov et al. 1996). Females were 2 times more in the sample from the island of Hydra (Greece) (Schmidt et al. 1997), and as the average for all surveyed sites in Turkey (Mirchev et al. 2004), in Albania – 1.2 times more (Mirchev et al. 2000). In Bulgaria in Kurtovo and Kardzhali higher participation of males was registered – 83.3% and 55.8%, respectively (Mirchev et al. 1998a).

The present finding of *B. transversalis* increase the strength of entomofauna of Bosnia and Herzegovina and enhance knowledge on parasitoid complex of *T. pityocampa* in this country.

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Sažetak

Baryscapus transversalis (Hymenoptera: Eulophidae) je determiniran kao jajni hiperparazitoid *Thaumetopoea pityocampa* (Lepidoptera: Notodontidae) u Bosni i Hercegovini. Uzgojen je iz jajnih legla borovog četnjaka prikupljenih s lokaliteta Boračko jezero (Konjic) i time postao nova vrsta u entomofauni Bosne i Hercegovine. U laboratorijskim uvjetima uzgojeno je 80 jedinki *B. transversalis* u razdoblju od 3. do 22. studenog 2013. godine. Iz jaja *T. pityocampa* razvili su se i mužjaci i ženke *B. transversalis* u odnosu (♀♀:♂♂) 3:1.

KLJUČNE RIJEČI: prvi nalaz, hiperparazitoid, *Thaumetopoea pityocampa*, Bosna i Hercegovina